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Keynote I

Information and Communications Technologies for Ubiquitous Healthcare

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Abstract

In most developed and rapidly developing countries, there has been a continual increase in life expectancy primarily due to improvements in public health, nutrition and medicine. However, this is now coupled with aging population demographics and falling birth rates, which when combined, are expected to significantly burden the socio-economic well-being of many of these countries. In fact, never before in human history have we been confronted with such a large aging population, nor have we developed solid, cost-effective solutions for the healthcare and social needs and well-being of the elderly. In this keynote presentation, we will describe an ongoing project in Ubiquitous-Healthcare as a contribution of the application of science and technology, especially information, communications and computation technologies, for the benefit of humanity, especially the elderly. This project is focused on a smart medical home as a convergence of ubiquitous-health (U‐Health) and ubiquitous-environment (U-Environment). The focus of our research is on helping elderly people live a more independent and healthy life as long as possible, in their own home, while being remotely monitored and assisted in an unobtrusive, non-invasive and seamless manner. Through a few examples in walking, sleeping, body sensors and smart home server, we will discuss our ideas and on-going research work about the challenges of the smart U-Health home project. In particular, we will focus on the critical roles advanced, low-cost sensing, actuating, communications, computation and information technologies in developing innovative, low-cost and high impacting solutions to the looming elderly demographic crisis.

About the Speaker

Dr. M. Jamal Deen (FIEEE) is Canada Research Chair in Information Technology, Professor of ECE and Professor of Biomedical Engineering at McMaster University. He completed his Ph.D. at Case Western Reserve University where he was both a Fulbright-LASPAU Scholar and an American Vacuum Society Scholar. His doctoral work on dynamic temperature measurements and combustion optimization in rocket and jet engines was sponsored and used by NASA, Cleveland, USA. His current research interests are nanoelectronics, optoelectronics and nanotechnology and their emerging applications to life and environmental sciences.

Dr. Deen is regarded as the world's foremost authority in modeling and noise of electronic and optoelectronic devices. He has successfully transferred powerful engineering and circuit models for high-performance semiconductor devices to several companies. His practical models and experimental innovations for reliability prediction have contributed significantly to the design and manufacture of

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reliable high-performance photodetectors. Dr. Deen's research record includes more than 480 peer-reviewed articles (about 20% are invited) and six patents that have been used in industry. He is the author/editor of 20 books and conference proceedings, two textbooks "Silicon Photonics – Fundamentals and Devices", Wiley (2012) and "Fiber Optic Communications - Fundamentals and Applications", Wiley (2014), 16 invited book chapters, and has received 12 best paper/poster awards. Over his career, he has won more than fifty awards and honors.

Dr. Deen's peers have elected him to Fellow status in nine national academies and professional organizations, including The Royal Society of Canada (FRSC) - The Academies of Arts, Humanities and Sciences of Canada, The Institute of Electrical and Electronic Engineers (FIEEE), The American Physical Society (FAPS) and The Electrochemical Society (FECS). His other awards and honors include the Callinan Award and the Electronics and Photonics Award from the Electrochemical Society; the Research Award from the Humboldt Foundation; the Eadie Medal from RSC; the McNaughton Gold Medal, the Fessenden Silver Medal and the Ham Outstanding Engineering Education Award from IEEE Canada; and three honorary doctorates from University of Waterloo, Canada, Universidad de Granada, Spain and Universitat Rovira i Virgili, Spain.